

1) The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2) **Claims 44-45, 48-78 and 81-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larson (US 6,858,665) in view of Europe 187 (EP 341187), Crawford et al (US 6,044,882) and Japan 513 (JP 2001-088513).**

Larson discloses a cured TIRE having a TREAD. The rubber composition for the TIRE TREAD comprises:

100 parts of at least one diene based elastomer,
1-20 parts inorganic material (e.g. intercalated and exfoliated
montmorillonite clay in the form of organophilic platelets having a thickness of
about 1-20 nm) and

20-99 parts reinforcing filler comprising carbon black and/or silica.

Larson teaches that the composition has significantly increased modulus G' and therefore increased stiffness without significant sacrifice in tan delta values. Larson also teaches that the 100 percent and 150 percent modulus values are appreciably increased. See Examples. Larson is silent as to the tread having a cap base construction.

As to claims 44 and 77, it would have been obvious to one of ordinary skill in the art to provide Larson's tire with a **cap base construction** such that (a) Larson's rubber composition (which after vulcanization has significantly increased modulus G' and

appreciably increased 100 percent and 150 percent modulus) is used for the tread base (radially inner layer) and (b) the dynamic elastic modulus (E') at 23°C of the tread base (radially inner layer) is greater than or equal to 15 MPa and less than or equal to 20 MPa since (1) it is well known / conventional in the tire tread art as evidenced by Europe 187 that a tire should have a cap base construction so that the cap can be formulated for traction and tread wear whereas the base is formulated for good rolling resistance, (2) Crawford et al teaches that treads of rubber tires are often prepared of a cap/base structure (col. 1 lines 53-62) and (3) Japan 513 suggests providing a pneumatic tire with a cap base tread such that the dynamic modulus of elasticity E1 at 25°C of the base is 15.0 MPa or more, the dynamic modulus of elasticity E2 of the cap is 50% or less of the dynamic modulus of elasticity E1 of the base and the volume V2 of the cap is 3 or more times the volume V1 of the base *in order to improve braking performance* (abstract, Figures 1-4, paragraphs 7 and 12 of machine translation). In INVENTION example 1 in Table 1, the cap has a dynamic elastic modulus E' at 25 degrees C of 8.0 MPa, the base has a dynamic elastic modulus E' at 25 degrees C of 20.0 MPa and the volume V1 of the base is 22% of the total volume of the tread.

With respect to the claimed tire construction (claims 44 and 77), it would have been obvious to one of ordinary skill in the art to provide Larson's tire with a carcass comprising at least one ply, a belt comprising at least one belt strip, sidewalls and bead wires wherein each bead wire is enclosed in a respective bead since (1) Japan 513 teaches providing a pneumatic tire with tire components including carcass 2, belt layers 3 and bead cores 1 (Figure 1, paragraph 8 of machine translation) and (2) Crawford et

al teaches that it is conventional to provide a pneumatic tire with tire components including carcass plies, belt layers, sidewalls, bead wires, beads (Figure 9, col. 2 lines 12-37). Furthermore, it would have been obvious to one of ordinary skill in the art to assemble the tire components and heat and vulcanize the tire in a mold since Crawford et al teaches assembling the tire components and vulcanizing the tire and forming the tread pattern in a mold (col. 10 lines 7-19).

As to claims 45 and 78, Larson teaches a thickness of 1-20 nm for the inorganic material (montmorillonite clay). See col. 5 lines 12-18.

As to claims 48 and 49, it would have been obvious to provide the base tread with the claimed thickness since Japan 513 teaches forming the cap base tread such that the volume V2 of the cap is 3 or more times the volume V1 of the base in order to improve braking performance. In INVENTION example 1 in Table 1, the volume V1 of the base is 22% of the total volume of the tread.

As to claims 50, 51 and 81, Larson teaches using 1-20 parts of the inorganic material (montmorillonite clay). See col. 3 lines 60-63.

As to claims 52-55 and 82, Larson teaches using montmorillonite clay. See for example col. 3 lines 20-42, col. 5 lines 5-39 and col. 6 lines 9-33.

As to claims 56 and 57, Larson teaches using quaternary ammonium salt (col. 4 lines 1-62).

As to claims 58-63 and 83-84, it would have been obvious to one of ordinary skill in the art to use elastomer as claimed in view of (1) Larson's disclosure to use elastomer as described at col. 6 lines 42-67 for the tread, (2) Crawford et al's disclosure

to use elastomer as described at col. 8 lines 32-44 and (3) Crawford et al's disclosure to from a tread base such that it comprises 60 parts cis 1,4 polybutadiene rubber and 40 parts natural rubber (Table 1) for the radially inner layer of the tread. With respect to claims 62-63 and 84, it would have been obvious to additionally include EPDM in the tread base since it is taken as well known / conventional per se in the tire tread art to use EPDM in addition to a diene based elastomer in a rubber composition for a tire tread. It is noted that natural rubber has a Tg below 20 degrees C.

As to claims 64-74 and 85-89, it would have been obvious to provide the tread base with carbon black, silane coupling agent and silica as set forth in claims 64-74 and 85-89 in view of (1) Larson's disclosure at col. 7 lines 1-46 and (2) Crawford et al's disclosure to use 50 parts carbon black (N550, which has CTAB within the claimed range of not less than 20 m²/g) in a tread base (Table 1) and (3) with respect to claims 68-74, Crawford et al's teaching that a cap base tread having a silica reinforced cap tread and carbon black reinforced tread base may have a minor amount of silica in addition to the carbon black in the tread base and that silane coupling agent should be used when the reinforcing filler includes silica.

As to claims 75 and 76, it would have been obvious to one of ordinary skill in the art to provide the tread cap such that the dynamic elastic modulus E' at 0 degrees C is greater than or equal to 5 MPa and less than or equal to 15 MPa since Japan 513 suggests providing a pneumatic tire with a cap base tread such that the dynamic modulus of elasticity E1 at 25°C of the base is 15.0 MPa or more and the dynamic modulus of elasticity E2 of the cap is 50% or less of the dynamic modulus of elasticity

E1 of the base. In INVENTION example 1 in Table 1, the cap has a dynamic elastic modulus E' at 25 degrees C of 8.0 MPa and the base has a dynamic elastic modulus E' at 25 degrees C of 20.0 MPa.

3) Claims 79 and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larson (US 6,858,665) in view of Europe 187 (EP 341187), Crawford et al (US 6,044,882) and Japan 513 (JP 2001-088513) as applied above and further in view of Koyama et al (US 2002/0007893) and Okada (US 6,039,826)

As to claims 79 and 80, it would have been obvious to one of ordinary skill in the art to form the tread base (radially inner layer) using strip winding since Koyama et al (paragraph 59) and Okada (Figure 6b), both directed to a cap base tread, suggest winding a ribbon to form the tread base (paragraph 59).

Remarks

4) Applicant's arguments with respect to claims 44-45 and 48-89 have been considered but are moot in view of the new ground(s) of rejection.

With respect to applicant's comments on Europe 187 and Larson, examiner makes the following comments: Applicant misses the point as to Europe 187 - tire treads should have a cap base structure. The tread cap should be formulated for traction so that the tire does not slip. The base can be formulated differently because it is a non ground contacting layer (at least when the tire is new). The common use of cap base construction is further evidenced by Crawford et al ("treads of rubber tires are often prepared of a cap/base structure"). Moreover, see Japan 513's teaching to use a cap base structure because high performance cannot be obtained when using a single

layer tread (paragraph 3 of machine translation). The applied prior art provides ample suggestion to use a cap base structure in Larson's tire; applicant having presented no convincing argument and/or evidence to the contrary. With respect to G' and E', applicant confuses shear and tension. Moreover, applicant ignores Larson's teaching to use the clay where increased stiffness is desired.

5) No claim is allowed.

6) Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven D. Maki whose telephone number is (571) 272-1221. The examiner can normally be reached on Mon. - Fri. 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Steven D. Maki/
Primary Examiner, Art Unit 1791

Steven D. Maki
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